MINERALOGY AND PETROGRAPHY.[1]

RECENT TEXT-BOOKS OF MINERALOGY AND PETROGRAPHY.—The appearance of the second edition of Professor E. S. Dana's well known Text-book of Mineralogy,[2] containing over fifty pages of new matter in the form of supplementary chapters, brings this admirable introduction to the science fully up to date, as well in respect to its treatment of the newest methods and apparatus for mineralogical investigation as in the completeness of the list of species mentioned.

Professor Gustav Tschermak's excellent Lehrbueh der Mineralogie, completed only near the end of 1883, fills the same place ni the German language that Dana's text-book does in English, and fills it so well that a second revised edition has already appeared,[3] having the imprint 1885. This work is especially strong in its treatment of the physical, particularly the optical, properties of minerals, as well as their modes of origin and occurrence. Considerable space is also devoted to their chemical relations, and an attempt made to classify them according to a scheme based somewhat on the periodic arrangement of the elements. The description of the species is, however, often too meager even for a text-book, many important minerals being mentioned only by name.

Professor A. de Lapparent, of Paris, author of the recent Traité de Géologie, has also just issued a mineralogical manual entitled Cours de Minéralogie.[4] A large proportion of this work is devoted to the treatment of crystallography, in which the cumbersome system of notation suggested by Haüy and developed by Lévy and Des Cloizeaux, is retained, as indeed it is in nearly all French works on mineralogy. The arrangement of the species is merely in accordance with the frequency of their occurrence. In other words the classification is purely geological, and it is among geologists that the work will probably prove to be of the greatest use.

The second volume of Hilary Bauerman's Mineralogy,[5] devoted to the description of species, is very unsatisfactory. Much that is very important, especially many results of the best recent mineralogical work, has been altogether disregarded, and the author conveys the impression of being by no means thoroughly acquainted with the newest methods or the latest discoveries in the science of which he treats.

Dr. Heinrich Baumhauer, well known for his researches on the figures artificially etched on crystal planes by chemical reagents

[1] Edited by Dr. GEO. H. WILLIAMS of the Johns Hopkins University, Baltimore, Md.

[2] Text-book of Mineralogy, new and revised edition, 1883 (Wiley & Sons).

[3] Lehrbuch der Mineralogie. Zweite verbesserte Auflage. Wien, 1885.

[4] Cours de Minéralogie. Par A. de Lapparent. 8vo, pp. 560, 519 cuts and one colored plate. Paris (Savy) 1884.

[5] Text-book of descriptive Mineralogy. Text-books of science series. 1884.

and their relation to the symmetry of the crystal, has just published a short text-book of mineralogy,[1] which, however, is very elementary in its character, being intended only for use in high schools or for the self-instruction of beginners.

Dr. Aristides Brezina, of the University of Vienna, has published the first part of an elaborate and exhaustive series of crystallographic researches, undertaken in competition for a prize offered by the Royal Academy of Science.[2] The first part, although covering over 350 octavo pages, deals only with methods of investigation, and constitutes a most valuable addition to the works on mathematical crystallography.

Fr. Ulrich, of Hanover, is the author of a quarto pamphlet, containing sixteen pages, covered with figures to illustrate the relations of the crystalline forms of the different systems, the development of hemihedral forms and some characteristic combinations of common minerals.[3] Many of the figures are colored. and, while roughly executed, they are useful in making plain to beginners some of the more elementary principles of crystallography. No printed explanations are appended.

A much-needed elementary text-book of microscopical mineralogy has very recently appeared, by Dr. Eugen Hussak, of Gratz.[4] Only such species are treated as enter into the composition of rocks, and these almost exclusively in reference to their appearance and the methods of their identification in thin sections under the microscope. The first part of the book deals with the methods of microscopical petrography—the construction of the microscope and the manner in which the optical properties of minerals are used for their identification; the method of separating rock constituents by means of a heavy solution, microchemical analysis and some of the most peculiar characteristics common to all minerals when examined in thin sections. The second part contains the distinguishing microscopic peculiarities of each rock-forming species arranged in tables, as is the case in Professor Brush's manual of Determinative Mineralogy. These are sometimes too concise to be satisfactory, but they nevertheless contain a great amount of information in a very small space. The means of distinguishing similar minerals are especially emphasized. A valuable list of references to the more important microscopic studies of different rock-forming minerals, arranged alphabetically, is annexed to these tables. The book is not a text-book of petrography, since rocks themselves are not described, but

[1] Kurzes Lehrbuch der Mineralogie einschliesslich der Petrographie. Von H. Baumhauer. 8vo, pp. 190. Freiburg, 1884.

[2] Krystallographische Untersuchungen an homologen und isomeren Reihen. Von Dr. A. Brezina. 1 Theil, Methoden. Wien, 1884. 8vo. pp. 359.

[3] Krystallographische Figurtafeln zum Gebrauche bei mineralogischen Vorlesungen. Von F. Ulrich. Hanover, 1885.

[4] Anleitung zum Bestimmen der gesteinbildenden Mineralien. Von Dr. E. Hussak. Leipzig, 1885, pp. 196.

rather an extension of the ordinary works on mineralogy. Although quite elementary, it will prove very valuable to those commencing work in microscopical mineralogy, to whom the vast amount of material contained in the larger manuals is often discouraging.

CROCIDOLITE FROM THE CAPE OF GOOD HOPE.—Considerable interest attaches to that fibrous stone with a rich yellowish-brown luster, which is beginning to find so wide an application in the arts, especially for the manufacture of small ornaments, and which jewelers generally designate as crocidolite. In its structure it much resembles the well-known "catseye," and when properly cut it can scarcely be distinguished from this except by its color, a fact which frequently causes it to be called "tiger's eye." The true crocidolite is an asbestiform hornblende, possessing a blue color, like its more compact equivalent glaucophane. Among other localities it occurs abundantly near the Orange river in South Africa, from which place specimens were analyzed by Klaproth[1] as early as 1815, and again by Hausmann and Stromeyer[2] in 1831. The latter authors gave it the name crocidolite in allusion to its fibrous structure (κροκίς, a woof). The occurrence of this mineral in Africa has been described by Cohen[3] and Stow.[4] The former says that a range of mountains extends in N. N. E. direction from the Orange river through the province of West Griqualand, the central part of which is known as the Asbestos mountains. Here the crocidolite occurs in veins from one to six inches in width, together with vast quantities of jasper and other forms of silica. Sometimes the crocidolite is pure and is then blue in color, soft, and easily separable into the finest fibers; more often, however, it is more or less decomposed and to a greater or less extent replaced by quartz. It is upon this alteration and replacement that the commercial value of the mineral depends. The yellowest specimens are most changed and owe their color to the almost complete oxydation of the iron. Wibel[5] studied the mineral in 1873 and concluded that it was a complete pseudomorph of quartz after crocidolite, only the iron of the original mineral being left in the form of göthite. Renard and Klement[6] have recently contributed an exhaustive paper on the subject. Analysis of the yellowest variety gave:

SiO_2	Fe_2O_3	Al_2O_3	CaO	MgO	H_2O
85.05	4.94	0.66	0.44	8.26	0.76

Total 100.11

[1] Chemische Abhandlungen gemischten Inhalts, 1815, pp. 233–242. Beiträge, VI, p. 237, 1815.

[2] Götting'scher gehl. Anzeiger, II, 1831, p. 1585.

[3] Neues Jahrbuch für Min., etc., 1873, p. 52.

[4] Quarterly Journal Geol. Soc., XXX, p. 622.

[5] Neues Jahrbuch für Min. etc., 1873, p. 367. (H. Fischer proved the same was the case for many varieties of catseye.—Tschermak Min. Mittheilungen, 1873, p. 117.)

[6] Bull. d. l'Acad. Roy. d. Sciences de Belgique (3), VIII, 1884, 530–550.

Analysis of the more greenish or bluish kind gave:

SiO_2	Fe_2O_3	FeO	Al_2O_3	CaO	MgO	H_2O
93.43	2.41	1.43	0.23	0.13	0.22	0.82

Total 98.67

They announce it as the result of a microscopic examination that the mineral is not a pseudomorph, but that the silica has been deposited between the fibers, which were already more or less altered, enclosing them in a hard transparent matrix.

PETROGRAPHICAL NOTES. — Becke[1] gives, in good form, the methods for microscopically distinguishing augite and bronzite. ——Scharizer, of Vienna, has studied the hornblende from Jan Mayen, and appends some interesting remarks regarding the general chemical constitution of the aluminous hornblendes.[2] He regards them as isomorphous mixtures of typical actinolite $(Mg\ Fe)_3\ Ca\ Si\ Si_3\ O_{12}$ and a molecule $\dot{R}_3\ \dot{R}_2\ Si_3\ O_{12}$, to which he applies Breithaupt's old name, syntagmatite.——Merian contributes an interesting attempt to trace the relation between the composition of an eruptive rock and that of the pyroxene mineral which it contains.[3]——J. Eliot Wolff gives a short note on the occurrence of nephelinite and nepheline-tephrite, both rich in a mineral of the sodalite group and often containing olivine, in the Crazy mountains, an isolated range north of the Yellowstone river, in Montana.[4] These rocks have never before been observed within the limits of the U. S.——Very interesting is the discovery, by J. S. Diller, of a new type of volcanic rock—a hypersthene basalt—on Mt. Thielson, Oregon,[5] on the surface of which fulgurites were found to be largely developed. This rock is new, but exactly fills a vacancy in the accepted rock classification.—— The same writer mentions peridotites which break through the Carboniferous strata of Kentucky in the form of dykes, enclosing fragments of the adjacent rock. He also finds, upon microscopic examination, that the rock of the new volcano on Bogosloff island, near Alaska, is a hornblende-andessite.[6]——Renard has given an elaborate microscopic study of the volcanic and cosmic dust that forms so large a portion of the deepest ocean deposits.[7] ——Holst and Eichstadt[8] have described from Slättmossa, in Sweden, an amphibole granite having a beautiful spherulitic structure not inferior to that of the well known "napoleonite" or "corsite," a nodular diorite from Corsica, described by Vogel-

[1] Tschermak Min. Pet. Mittheilungen, v, 1883, p. 527.
[2] Neues Jahrbuch für Min, etc., 1884, II, p. 143.
[3] Ib., III Beil. Band, p. 252, 1885.
[4] Ib., 1885, I, p. 69.
[5] *Amer. Jour. Science*, Oct. 1884, p. 253.
[6] *Science*, v, pp. 65 and 66, Jan. 23, 1885.
[7] Bull. Mus. Roy. d'Hist. Nat. d. Belgique, III, 1884, 1–24. *Nature*, April 17, 1884.
[8] Geol. Fören. i. Stockholm Förh., 1884, Vol. VII, p. 134.

sang (Niederrhein. Gesell. für Natur-und Heilkunde, 1862). A similar diorite has been mentioned by Reinhold[1] as occurring in Placer county, Cal. (vid. NATURALIST, 1882, p. 610).——Michel-Lévy[2] has established seven different types of volcanic rock occurring in and near Mont Dore, in Central France. They include domite, cinerite, trachyte, andesite, phonolite and basalt.

BOTANY.[3]

HYBRIDIZATION OF POTATOES.—During the past year some experiments were made at Reading, England, upon the grounds of Messrs. Sutton & Sons, the eminent potato growers. Under the advice of Mr. J. G. Baker the attempt was made to secure a hybrid between the common potato and the Darwin potato (*Solanum maglia*) from the southern part of South America. The experiment is reported as having been successful, and we may look ere long for the tubers of this new form. "Every gardener and farmer may now welcome the birth, so to speak, of a hybrid which we may hope will enable the potato plant to resist the attack of parasites, and especially of those of the devastating fungus, *Peronospora infestans.*"

HETEROECISM OF CEDAR APPLES.—Dr. Farlow has been studying the cedar apples (species of Gymnosporangium) with a view to determining whether the cluster cups (species of Rœstelia) of the apple (Pirus), hawthorn (Cratægus) and June-berry (Amelanchier) are stages of the fungus which occurs on species of cedars (Juniperus). In a recent paper read before the American Academy of Arts and Sciences, the results of a series of experiments are given, the general bearing of which is in favor of the doctrine of heteroecism. After discussing the difficulties and the objections which may be raised, the author says that "the conclusions to be drawn are, that:

"1. The æcidium of *Gymnosporangium biseptatum* is probably *Rœstelia botryapites* [on Amelanchier].

"2. The æcidium of *G. globosum* (to be kept distinct from *G. fuscum*) is possibly *Rœstelia aurantiaca* [on *Cratægus oxycantha*].

"3. The æcidium of *G. macropus* is to be sought among the Rœsteliæ growing especially on apples and Amelanchier."

NORTH AMERICAN FORESTS.—The North American continent, or that part of it situated north of Mexico, may be conveniently divided, with reference to its forest geography, into the Atlantic and the Pacific regions by a line following the eastern base of the Rocky mountains and its outlying eastern ranges from the Arctic circle to the Rio Grande. The forests which cover these two divisions of the continent differ as widely in natural features, composition

[1] Proc. Philad. Acad. Nat. Science, 1882, p. 59.

[2] *Comptes Rendus*, T. XCVIII, 1884, p, 1394.

[3] Edited by PROF. C. E. BESSEY, Lincoln, Nebraska.